DEPARTMENT OF PUBLIC UTILITIES

Thomas M. Dolan
Mayor

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DEVELOPMENT REQUIREMENT

This development requirement is as of July 1, 2012 and is subject to change.

The following is a list of typical Public Utility development requirements. Some of the items may not apply. Additional requirement may be applied. The developer will be required to submit utility drawings (24"X36") for review and approval. Drawings shall include all information as required in the Preliminary Letter.

It is anticipated that when all requirements of the Public Utilities Department have been met, a Public Utilities Final Approval Letter will be issued. Signing by the developer or his/her representative will be required. A drawing/drawings, signed as approved by the City and the developer issued for use by the developer and his contractor. Signing of the Public Utilities Final Approval letter, payment of fees, and posting of a bond must be completed prior to beginning construction work on the site.

WATER:

Water service for this development is contingent on the following conditions:

1. All current Sandy City ordinances, policies, and fees pertaining to water system development, service connections, and installation shall be adhered to.

2. The City shall be given the first right of refusal to purchase any water rights accompanying the property in this development.

3. All water mains and service laterals shall be installed, pressure tested and bacteriological samples taken in accordance with the Sandy City Standard Specification and Details for Municipal Construction.

4. Developer agrees that any existing water facilities (lines, meters, hydrants, etc.) owned by Sandy City which are found to not meet current City standards or to be adversely affected by the development during construction, necessitating them to be upgraded, moved or otherwise altered to facilitate maintenance (as determined by the City), shall be the developer's responsibility at no cost to the City.

5. Fire hydrant placement, water meters, and fire flows will be determined when the plans have been submitted for site plan review.

6. The developer will be required to pay a water line reimbursement fee of $8.50/ft of frontage for pipe larger than 10" that was installed by the City.

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7. The developer will be required to grant to the City a 15' wide water line easement (7.5' either side of pipe) for all main lines installed on private property. Easement shall be on a signed standard easement form. Typically, this is done after all the waterlines have been installed and before the 90% Bond release.

8. Show water meter size and location on the utility plan. This includes existing meter. Water meter that is 1 ½ " or bigger need to be in a meter vault (See Figure 08 to Figure 10 for detail).

9. A separate landscape meter is required if a landscape/irrigation plan is required. Call out a landscape meter both in the Utility Plan and the Irrigation Plan. This meter can be a separate connection to the water main or it can come off the service line after the water meter.

10. **All water meters shall be placed in a landscaped area.**

FLOOD CONTROL AND IRRIGATION:

1. All drawings and calculations should be *stamped, signed and dated* by an engineer licensed to practice in the State of Utah for the final submittal.

2. A copy of the State approved Storm Water Pollution Prevention Plan (SWPPP) [Full version in a separate package] and a copy of the Notice of Intent (NOI) is required prior to Final Approval. [OR] Because this project is less than 1.0 acre, a copy of the Notice of Intent (NOI) is not required. However, a site specific Storm Water Pollution Prevention Plan (SWPPP) and an erosion control plan is required prior to Final Approval.

3. A pre-construction meeting is required once Final Approval has been granted. This is where the developer/owner and the contractor meet with the City's inspectors to go over the approved plans. A pre-construction meeting can be schedule through the Planning Department.

4. It is required that the intensities used in the Storm Water Master Plan be used in the calculation of storm water runoff. The type of storm required is indicated below. Depth-duration-frequency tables for different types of storms, based on the Storm Water Master Plan, are enclosed. *Please note that rainfall intensities are to be adjusted based on the mean elevation of the site.*

5. There are three options to detention:

    a. It is likely that detention of storm water runoff will be required. Storm water outflow from the site will need to be restricted to 0.2 cfs/acre unless otherwise written in the Preliminary Letter. The capacity of the downstream flood control system piping may be checked using the Mannings formula or hydraulic grade line calculations. Calculations should be based on a 10-year, 3-hour storm. **The developer should**

submit those findings to Sandy City Public Utilities. With the help of the above findings, the rate of allowable discharge from the site will be determined by Sandy City Public Utilities. Based on that discharge rate, the developer should provide calculations showing storm water detention volume requirements for a 10-year, 3-hour storm.

b. Detention of storm water runoff is required. The developer should provide calculations showing storm water detention volume requirements for a 10-year, 3-hour storm (see attached Rainfall Intensity Table), with storm water outflow from the site restricted to 0.2 cfs/acre unless otherwise written in the Preliminary Letter.

c. Detention of storm water runoff is required. Because this project is in a Sensitive Overlay Area, the developer should provide calculations showing storm water detention volume requirements for a 25-year, 3-hour storm, with storm water outflow from the site restricted to 0.2 cfs/acre unless otherwise written in the Preliminary Letter..

6. Show detention ponds, including the maximum water surface perimeter line and maximum water surface elevation. The pond perimeter line and surface elevation should be based on the finish grades in the pond area. Detention ponds in driving and parking areas should be no deeper than 12" at peak detention. We recommend that an overflow be provided for storm water runoff accumulations beyond the 10-year storm to avoid deep ponding in parking areas. Typically, depressions in the landscaping along the frontage of the property, for the purpose of storm water detention, are not allowed. The developer should work with the Planning Department on this issue. Detention pond must either be grass or concrete.

7. The developer should provide calculations showing the basis for the size of the restrictive orifice. In calculating the orifice size, use a head equal to the distance from the maximum water surface elevation to the center of the orifice. We recommend that the orifice be on the outlet pipe so that sedimentation and debris is less likely to plug the orifice. A 2" diameter orifice is the smallest size required. If a 2" diameter orifice results in a discharge of more than 0.2 cfs/acre, it is permissible to consider the greater discharge rate in the calculation of storm water detention volume.

8. Indicate on the drawings, in a "call-out", or by means of a detail, specify the location (which box and location relative to outlet pipe opening) where the restrictive orifice plate is to be installed ("Orifice is to be on the bottom of the pipe outlet") as well as the size of the orifice to the nearest 1/8 inch.

9. Because there are no usable storm water facilities in the area, retention of storm water runoff is required. Sandy City has a Drinking Water Source Protection ordinance, and generally, retention ponds and sumps are not permitted, especially if the project falls within the primary recharge zone. **However, if there are no other options,** retention ponds and sumps may be approved. As part of the approval, the following items should be done:

- Because there are no usable storm water facilities in the area, retention of storm water runoff is required. Sandy City has a Drinking Water Source Protection ordinance, and generally, retention ponds and sumps are not permitted, especially if the project falls within the primary recharge zone. **However, if there are no other options**, retention ponds and sumps may be approved. As part of the approval, the following items should be done:

    - The developer should contact the reviewing engineer requesting a letter of approval for the retention pond and/or sump. **It is recommended that the reviewing engineer be contacted (801-568-7280) immediately to review this issue.**
    - ***Typically, a sump qualifies as an injection well*. The developer should submit a "Utah Underground Injection Control Program Inventory Information" form to the State Department of Environmental Quality, Division of Water Quality, Ground Water Protection Section to receive authorization by rule. The developer or his engineer should contact the State if there are any questions. The State will review the Inventory form and determine whether a permit is required. <u>It is recommended that this Inventory form be submitted immediately</u>.**
    - The developer should submit a soils test report, stamped, signed and dated by a soils engineer, indicating soils types and depths, ground water depth (should be below sump floor and/or retention pond bottom elevation) and soil permeability rate.
    - The permeability rate of the soil may be used as a discharge rate.
    - The developer should provide calculations showing retention volume requirements for a 10-year, 3-hour storm.
    - Any existing sump must be replaced with a new sump, or it must be shown and accepted that the existing sump is adequate.
    - The developer should submit plans and details of the sump design. **If gravel is used in the sump, 1 ½ – 2" (min.) gravel should be specified, with a maximum void ratio of 40%.**
    - Show retention ponds, including the maximum water surface perimeter line and maximum water surface elevation. The pond perimeter line and surface elevation should be based on the finish grades in the pond area. Retention ponds in driving and parking areas should be no deeper than 12" at peak retention. We recommend that an overflow be provided for storm water runoff accumulations beyond the 10-year storm to avoid deep ponding in parking areas.
    - Typically, depressions in the landscaping along the frontage of the property, for the purpose of storm water retention, are not allowed. **The developer should work with the Planning Department on this issue.**

10. Indicate on the drawings the routing of storm runoff for a 100-year, 72-hour storm to determine where the flood would go if the rainfall intensities are greater than the 10-year storm. Provide a 100-year, 72-hour calculations for runoff in cfs. Storm runoff should

not be allowed to run onto neighboring properties (unless an easement allowing such can be obtained) or to reach the buildings on this site.

11. The following note shall be added to the subdivision plat: "No driveway shall be constructed so as to convey storm runoff toward any building."

12. Show on the drawings the location of all existing utility lines, and provide adequate separation to satisfy the requirements of the utility line owners.

13. Developer agrees that any existing storm water facilities (lines, manholes, detention pond, etc.) which are found to not meet current City standards or to be adversely affected by the development during construction, necessitating them to be upgraded, moved or otherwise altered to facilitate maintenance (as determined by the City), shall be the developer's responsibility at no cost to the City.

14. Indicate on the drawings the size, slope and material of all *existing and proposed* pipes. All storm water pipes 12" or higher shall be RCP. For smaller diameter pipes, PVC or HDPE may be used. All pipes that are to be maintained by Sandy City should have a minimum diameter of 15". All pipes that connect to Sandy City's system must have a minimum diameter of 15". All pipes should have a minimum cover of 12" to top of pipe bell. Pipes should have sufficient slope to produce a minimum velocity of 3 fps. A minimum slope of 0.50% is required for 15" pipe.

15. A maximum of 300 linear feet is allowed between clean out manholes.

16. Typically, a maximum of 600 linear feet is allowed between curb inlet boxes in roadways. Provide calculations for storm runoff flow, time of concentration, and gutter flow spread. Provide recommendation criteria/justification for proposed locations of curb inlet boxes. Provide calculations indicating the capacity of the inlet boxes.

17. Indicate on the drawings all top of lid/top of grate and flowline elevations at all *existing and proposed* clean out boxes and inlet boxes.

18. Show on the drawings that the last clean out or inlet box on the site, prior to connecting to the city-maintained storm water system, has a sand trap equal in depth to the diameter of the outlet pipe.

19. All inlet boxes and clean out boxes should conform to Sandy City Standard Specifications and Details for Municipal Construction. Indicate on the drawings the Sandy City detail number for each box. Unless there is a special reason to do otherwise, all curb inlet boxes should be called out as standard detail SW-03A and SW-03B on the construction drawings. Clean out boxes should be called-out on the drawings as SW-05A and SW-05B. Combination boxes should be called out on the drawings as SW-06A and SW-06B. **A combination box should be used any time there are two or more pipes connecting to the same box where an inlet is proposed. Clean out boxes are required on all junctions in both private and public storm water systems.**

20. If this project includes a flood plain, the existing flood plain area should be shown according to the FEMA flood plain maps.

21. **An oil/water separator is required prior to discharge into any storm water system. The oil/water separator should be designed so that the flows during the first 15 minutes of a 2 year, 1-hour storm will be allowed to stay in the detention pond/holding area of the separator for a time sufficient for 98% of the oil to rise above the outlet side of the central chamber in the separator. In calculating the size of the separator, the following factors are recommended: 1) the oil has a specific gravity of 0.89, 2) the runoff water has a temperature of 50 degrees Fahrenheit, 3) the oil entering the separator has a concentration of 400 p.p.m., and the allowable concentration of oil leaving the separator has a concentration of 10 p.p.m. (98%), 5) the rainfall intensity to use is based on the 10-year, 3-hour storm intensities, 6) assume a terminal rise rate of 0.00055 ft/s.**

22. The separator should be designed with a bypass to allow the higher flows beyond the first 15 minutes to flow outside the separator without flushing the separator out.

23. It is noted that the above formula for sizing the oil/water separator is based on a simple, three/chamber oil/water separator. If the developer desires to submit other products and designs, technical information about the separator, how it works and how it is sized, should be submitted for review.

24. **If this project adjoins the East Jordan Canal / Jordan and Salt Lake Canal right-of-way, the developer should obtain a letter of approval from Salt Lake City Public Utilities, a copy of which should be submitted to Sandy City Public Utilities. The developer should first send a copy of the site plans, <u>along with the enclosed Memorandum</u>, to Salt Lake City Public Utilities. It is recommended that this process be started as soon as possible so as not to delay the construction of the project.**

25. **If the storm drain system connects to a County Storm Drain System, the developer should submit a letter, giving approval to connect to the storm water facilities, from Salt Lake County. It is recommended that this process be started as soon as possible so as not to delay the construction of the project.**

26. **If the storm drain system connects to UDOT Storm Drain System, the developer should submit a letter, giving approval to connect to the storm water facilities from U.D.O.T. It is recommended that this process be started as soon as possible so as not to delay the construction of the project.**

27. Submit signed easements for all existing or new storm water lines that pass through the property for this development and are maintained by Sandy City. Typically, an easement width of twenty feet, centered on the storm water or irrigation pipe, is required. The language in the easements should be approved by Sandy City prior to obtaining signatures. Required easement form can be obtain by calling reviewing engineer at the

number listed at the beginning of this document.

28. The developer is required to provide a continuance of appropriate irrigation facilities for irrigation water users who historically have relied upon facilities on or crossing through the project site, including any needs that may become apparent during or after construction of the project. The design and construction of any irrigation facilities should be approved by any down-stream users, the irrigation company, and by Sandy City Public Utilities.

29. Show all existing irrigation ditches and pipes on and adjacent to the property, with pipe sizes, and flow line and top of box elevations.

30. Irrigation easements of record are to be shown on the drawings. If there is no irrigation easements of record for an existing irrigation facility, an easement must be provided. Contact the irrigation facility owner to determine the required width.

31. It is required that all existing irrigation canal, ditch or pipe that is maintained by Sandy City be replace with R.C.P. Drawings should include details for irrigation boxes, head walls, head gates and grates. Size pipe to handle the existing flow requirements. Contact Ted Ketten, Sandy City Public Utilities, (801) 352-4407, for additional information about these requirements.

32. There may be existing irrigation facilities which potentially could be abandoned. However, it is the developer's responsibility to do any research necessary to make that determination.

33. Submit irrigation facility design drawings to Sandy City and the ditch owners/users for approval. A letter must be obtained from the irrigation facility owner(s) and user(s) (approving the plans) and submitted to Sandy City Public Utilities.

34. Additional requirements may applied for this project.

STREET LIGHTS:

1. Developer may be required to install a residential or arterial streetlight along their frontage per Sandy City Standards and Specifications. Locations of the streetlight will be determined during the Preliminary Review.

UTILITIES:

1. To comply with Sandy City Ordinance 15A-23-12, All utility lines shall be placed underground in designated easements. No pipe, conduit, cable, line for water, gas, sewage, drainage, steam, electricity, or any other energy or service shall be installed on a permanent basis above ground. However, back flow devices have to be installed above

ground. Therefore, no pole or other support structure shall be erected, altered, or replaced upon any lot (outside of any building) above the surface of the ground except for hoses, movable pipes used for irrigation or other purpose during construction.

2. Each contractor and owner/developer shall be responsible to know the whereabouts of all underground utilities. Protection of such utilities shall also be their responsibility. Prior to construction, contact must be made with "Blue Stakes" to identify underground utility lines.

3. Where overhead poles exist, service lines to new developments must be placed underground from the nearest overhead service pole.

4. All utility lines associated with the pre-existing utility pole(s) shall be placed underground across the frontage of the development.

5. All utility boxes, e.g., transformers, switch gear, telephone, cable tv, back flow preventers, etc., shall be shown on the site plan and utility plan and shall be placed a minimum of 5 feet from any sidewalk or parking lot curbing. Said utility boxes shall not be located within any required traffic sight triangle(s), as determined by the Sandy City Transportation Engineer and shall be screened from view with appropriate landscaping or architectural elements compatible in material and color with the primary structure. Each box shall be shown in its exact location and shall be noted with its exact height, width, and length. (Ord 09-01, Amended 3-5-2009)

6. The developer should contact Rocky Mountain Power for installation service, charges, permits, and related items that they will require for developments that are within Sandy City's borders.

WATER EFFICIENT LANDSCAPE:

Documentation

A Landscape Plan Documentation Package shall be submitted to and approved by the Sandy City Public Utilities Department as part of the final review process. The Landscape Plan Documentation Package shall consist of the following items:

1. Planting Plan. A detailed Planting Plan shall be drawn at a scale that clearly identifies the following:

    - Location of all plant materials, a legend with botanical and common names, and size of plant materials
    - Property lines and street names
    - Existing and proposed buildings, walls, fences, light poles, utilities, paved areas and other site improvements

- Existing trees and plant materials to be removed or retained
- Designation of Landscape Zones

2. Irrigation Plan. Irrigation plans shall be prepared and stamped by a licensed landscape architect or a licensed landscape contractor. A detailed Irrigation Plan shall be drawn at the same scale as the planting plan and shall contain the following information:

   - Layout of the irrigation system and a legend summarizing the type and size of all components of the system, including manufacturer name and model numbers
   - Static water pressure in pounds per square inch (psi) at the point of connection to the public water supply
   - Flow rate in gallons per minute and design operating pressure in psi for each valve and precipitation rate in inches per hour for each valve with sprinklers
   - Location and Size of Water Meter, which shall be used exclusively for landscape purposes;
   - Location of the point of connection, sprinkler heads, backflow prevention device, main and lateral irrigation lines, quick couplers, irrigation controller and moisture sensor overriding device;
   - Size and flow rate of each irrigation zone, valve and sprinkler head; Static water pressure at point of connection; and Symbols, brand name and model number for each sprinkler head and irrigation device.

3. Grading Plan. A Grading Plan shall be drawn at the same scale as the Planting Plan and shall contain the following information:

   - Property lines and street names, existing and proposed buildings, walls, fences, utilities, paved areas and other site improvements
   - Existing and finished contour lines and spot elevations as necessary for the proposed site improvements

4. A Soils Report will be required where irrigated landscaped areas consisting of grass or similar turf exceed 33% of the overall landscaped area. The Soils Report shall describe the depth, composition, and bulk density of the top soil and subsoil at the site, and shall include recommendations for soil amendments. The Planting Plan shall incorporate the recommendations of the Soils Report into the planting specifications.

5. Landscape Water Allowance. The annual Landscape Water Allowance shall be calculated using the following equation:

   Landscape Water Allowance = ET_O x 1.0 x 0.62 x A

   Where Landscape Water Allowance is in gallons per growing season

   ET_O = Reference Evapotranspiration in inches per growing season
   1.0 = ET_O adjustment factor, 100% of turf grass ET_O (growing season adjustment factor)

0.62 = conversion factor
A = total Irrigated Landscape Area in square feet

6. Irrigation Schedule. A monthly Irrigation Schedule shall be prepared that covers the initial 90-day plant establishment period and the typical long-term use period. This schedule shall consist of a table with the following information for each valve:

- Plant type (for example, turf, trees, low water use plants)
- Irrigation type (for example, sprinklers, drip, bubblers)
- Flow rate in gallons per minute
- Precipitation rate in inches per hour (sprinklers only)
- Run times in minutes per day
- Number of water days per week
- Cycle time to avoid runoff

Landscape Design Standards
Design landscape according to the following criteria - refer to Ordinance 15-41 for additional information:

1. Plants are well-suited to microclimate and soil conditions at site, are relatively free from pests and diseases, and are generally easy to maintain.

2. Water-Conserving plants are used on slopes exceeding 30 percent.

3. Minimum four-inches of mulch on all irrigated non-turf areas.

Irrigation Design Standards
Design irrigation according to the following criteria - refer to Ordinance 15-41 for additional information:

1. Landscape Water Meter and backflow prevention assembly that are in compliance with state code shall be installed separate from the water meter installed for indoor use. The size of the meter shall be determined based on the irrigation demand. **This meter must be installed after the main meter and shall remain within the Sandy City Easement. The developer shall supply the landscape meter and materials. Show on the utility plan and landscape plan.**

2. Pressure regulator provided where water pressure exceeds manufacturers maximum recommended operating pressure for the sprinkler heads or where significant variation in water pressure will occur.

3. Automatic controller provided with multiple program and repeat cycle capabilities, automatic rain shut-off device, and a flexible calendar program.

4. On slopes over 30 percent, irrigation system shall consist of Drip Emitters, Bubblers or Sprinklers with a maximum Precipitation Rate of 0.85 inches per hour and adjusted

sprinkler cycle times to eliminate runoff.

5. Each valve irrigates area with similar site, slope, and soil conditions and plants with similar water needs. Turf and non-turf areas irrigated on separate valves.

6. Drip Emitters or a Bubbler shall be provided for each tree where practicable. Bubblers shall not exceed 1.5 gallons per minute per device. Bubblers for trees shall be on a separate valve unless specifically exempted by Sandy City Public Utilities due to the limited number of trees on the project. Filters and end flush values shall be provided as necessary.

7. Sprinklers have matched Precipitation Rate within each valve.

8. Check valves specified where low-head drainage will occur due to elevation differences. Pressure compensating values and sprinklers shall be required where a significant variation in water pressure will occur within the irrigation system due to the limited number of trees.

9. Irrigation zones with overhead spray or stream sprinklers shall be designed to operate between 6:00 pm and 10:00 am to reduce water lose from win and evaporation. This would exclude drip or bubbler zones.

10. Following Construction and prior to release of the secondary bond guarantee posted for the project, a Water Use Efficiency Review will be conducted by a Landscape Irrigation Auditor. The auditor shall be independent of the contractor, design firm, and owner/developer of the project. The water performance audit will verify that the irrigation system complies with the minimum standards required by Sandy City ordinance. The minimum efficiency required for the irrigation system is 60% for distribution efficiency for all fixed spray system and 70% distribution efficiency for all rotor systems. The auditor shall furnish a certificate to the City, designer, installer and owner/developer certifying compliance with the minimum distribution requirements. Compliance with this provision is required before the City will release the bond for this project.

The following notes should be added to the drawing(s), or revised to *match exactly* as shown below:

WATER NOTES

1. Notify Sandy City Public Utilities Inspector Roy Thacker or Willis Bilbrey, 801-568-7280, at least two working days prior to beginning any construction.

2. All construction shall conform to the latest revision of the Sandy City Standard Specifications and Details for Municipal Construction and/or other requirements as set

forth in the final approval letter established for the development. Specifications and details can be obtained at http://sandy.utah.gov/government/public-works/standard-specifications.html or from Sandy City Public Works department (568-2999)

3. Water line trenches in public and private roadways and traffic areas are to be thoroughly compacted until 95% of maximum density per ASTM D1557 is achieved. Density checks may be required by the City at any time.

4. Locate water line 4' off lip of gutter on the north and east side of the roadway.

5. A minimum of 48" of cover from the top of the pipe to the finish grade is required.

6. Use pressure rated 350 psi or better Ductile Iron Pipe.

7. Locate valves on property corners or curb P.C.'s.

8. Use 6" compression type hydrant by Mueller Centurion or Clow Medallion. Existing hydrants required for fire protection that do not meet current standards shall be upgraded to meet current Sandy City Standards.

9. All dead ends to be plugged with a 2" washout.

10. All water lines shall be poly-bagged in accordance with Sandy City Specifications and Details for Municipal Construction

STORM WATER NOTES

1. Notify Sandy City Public Utilities Inspector Roy Thacker or Willis Bilbrey, 801-568-7280, at least two working days prior to beginning any construction.

2. All materials and work done in [U.D.O.T] Street shall conform to U.D.O.T. standards and requirements.

3. A copy of the State approved Strom Water Pollution Prevention Plan (SWPPP) and a copy of the Notice of Intent (NOI) shall be accessible on site at all times during construction.

4. A pre-construction meeting is required once the Final Plan has been approved. The developer is required to have an on-site inspection performed and recorded by a qualified person on a weekly or biweekly basis. Items required by SWPPP permit include (but not limited to) inspector's name, contact information, qualifications, project status, BMPs implementation, etc.

5. All materials and work done on flood control facilities shall conform to the latest revision of the Sandy City Standard Specifications and Details for Municipal Construction.

Specifications and details can be obtained at http://sandy.utah.gov/government/public-works/standard-specifications.html or from Sandy City Public Works department (568-2999)

6. Non-shrinking grout shall be used wherever grout is required for the storm water facilities.

7. Cut pipes off flush with the inside wall of the box or manhole and grout at connection of pipe to box to a smooth finish. Additionally, all jagged or sharp edges at pipe connections are to be removed and grouted smooth.

8. Grout between grade rings. For each inlet box that is proposed to be located next to a curb, the curb and gutter contractor is responsible to remove all protruding, jagged or sharp concrete edges and to grout between bottom of inlet lid frame and top of concrete box. Grout to create a smooth, beveled transition at all edges in clean out and inlet boxes. Grout around all edges of the restrictive orifice plate.

9. Remove snap ties, nails, rebar and other protrusions from the box or pipe inside surface, as well as all form work, plastic and cardboard.

10. Silt and debris are to be cleaned out of all inlet, clean out boxes, and pipe. The boxes and pipes are to be maintained in a cleaned condition until after the final bond release inspection.

11. Clean off all manhole lids and inlet grates of asphalt, concrete, tar or other adhesives to allow access.

12. Steps are required in all clean out boxes and combination boxes that are to be installed according to Sandy City standard details and have a depth of four feet or more from top of lid to floor of box.

13. Where a sump is required, the drainage inspector Roy Thacker or Willis Bilbrey, 801-568-7280, shall be contacted prior to construction to provide an opportunity to check the volume of gravel, as well as the gravel gradation.

14. Signs are to be posted near each inlet box with the following words "WARNING THIS IS A DRINKING WATER AQUIFER RECHARGE AREA. DISPOSAL OF ANY WASTE MATERIALS IN THE STORM WATER IS STRICTLY PROHIBITED."

15. All precast clean out and inlet boxes shall be set on 12" (min.) compacted 1" minus gravel.

16. Submittals are required for all sand bedding, sand backfill, pipe, precast clean out boxes and precast catch basins for all facilities. They should be submitted at least five working days before construction. Submittals should have sufficient information to show that the proposed items conform to Sandy City specifications.

17. Relative to flood control facilities that are to be located in existing or future Sandy City roads: If the contractor desires to use native excavated material as bedding or backfill for the storm water pipe installation, sieve analysis and proctor tests shall be performed on each type of soil encountered and the test results submitted to Sandy City Public Utilities for approval at least two working days prior to beginning construction. The sieve analysis results must conform to Sandy City Specification, Section 02230, Part 2: Products, 2.02 Sand Bedding, in order for the material to be approved for pipe bedding. This specification for bedding the pipe (to 12" above the top of the pipe) shall be followed throughout the length of the pipe installation. The pipe bedding shall be compacted to 95% maximum dry density per ASTM D 1557.

STREETLIGHT NOTES

1. Notify Sandy City Public Utilities Inspector Roy Thacker or Willis Bilbrey, 801-568-7280, at least two working days prior to beginning any construction.

2. All materials and work done on streetlight shall conform to the latest revision of the Sandy City Standard Specifications and Details for Municipal Construction. Specifications and details can be obtained at http://sandy.utah.gov/government/public-works/standard-specifications.html or from Sandy City Public Works department (568-2999)

3. Specified aluminum poles shall be buried to a depth of 4 feet in earth. [Residential]

4. Concrete shall be poured around the bottom 30 inches of the pole excavation for stability. [Residential]

5. Fixtures shall be mounted at 18 feet. [Residential]

6. All electrical cables and conduit shall be buried a minimum of 18 inches below the ground surface.

7. Three #8 wire conductor (8-3/C Type TC 600 V VNTC or approved equivalent) shall be used on single pole installations. Aluminum wire will not be allowed.

8. All wire shall be in 1 ½ " conduit.

9. Wire connections in the hand hole shall be made with Burndy YC8L12 electrical connectors or equivalent. HSTO 4-48-5 Heat Shrink or equivalent shall by used to complete wire connections.

10. Burndy KA25U 14-1/0 AWG AL/CU Mechanical Lugs or equivalent shall be used to connect the ground wire to the grounding clip inside the hand hole.

11. A Gould Shawmut in line fuse holder with/boot #GEB-11-11-B and 15 Amp OTM15 Gould Fuse or equivalent shall be installed inside the junction box or transformer connection to the hot leg of the power cable.

12. Installations shall be located as indicated on the approved drawing for the project. Field modification must be approved by Sandy Public Utilities inspector.

13. Street light pole shall not be installed in a manner that will hinder the operation of fire hydrants or underground water system isolation valves.

14. Installations within close proximity to trees shall be avoided unless approved by Sandy Public Utilities inspector.

15. A junction box shall be installed at the base of each pole.

16. The developer shall ensure that all specifications are met as required in the Sandy City Specifications for Street Lights.

IRRIGATION/LANDSCAPE NOTES

1. Mulch: After completion of all planting, all irrigated non-turf areas shall be covered with a minimum layer of four (4) inches of mulch to retain water, inhibit weed growth and moderate soil temperature. Non-porous material shall not be placed under the mulch. 4" mulch in all irrigated non-turf areas. If rock mulch, minimum is 3".

2. Landscape Water Meter: A water meter and backflow prevention assembly that are in compliance with state code shall be installed for landscape irrigation systems, and the landscape water meter and backflow prevention assembly shall be separate from the water meter and backflow prevention assembly installed for indoor uses. The size of the meter shall be determined based on irrigation demand.

3. Pressure Regulation: A pressure regulating valve shall be installed and maintained by the consumer if the static service pressure exceeds 80 pounds per square inch (psi). The pressure-regulating valve shall be located between the landscape water meter and the first point of water use, or first point of division in the pipe, and shall be set at the manufacturer's recommended pressure for sprinklers.

4. Automatic controller: All irrigation systems shall include an electric automatic controller with multiple program and multiple repeat cycle capabilities and a flexible calendar program. All controllers shall be equipped with an automatic Rain Shut-off Device.

5. On slopes exceeding 30%, the irrigation system shall consist of Drip Emitters, Bubblers, or sprinklers with a maximum Precipitation Rate of 0.85 inches per hour and adjusted sprinkler cycle to eliminate Runoff.

6. Each valve shall irrigate a landscape with similar site, slope and soil conditions and plant materials with similar watering needs. Turf and non-turf areas shall be irrigated on separate valves.

7. Drip Emitters or a Bubbler shall be provided for each tree where practicable. Bubblers shall not exceed 1.5 gallons per minute per device. Bubblers for trees shall be on separate valve unless specifically exempted by the Sandy City Public Utilities Department due to the limited number of trees on the project site.

8. Sprinklers shall have matched Precipitation Rate with each control valve circuit.

9. Check valves shall be required where elevation differences will cause low-head drainage. Pressure compensating valves and sprinklers shall be required where a significant variation in water pressure will occur within the irrigation system due to elevation differences.

10. Drip irrigation lines shall be placed underground or otherwise permanently covered, except for Drip emitters and where approved as a temporary installation. Filters and end flush valves shall be provided as necessary.

11. Irrigation zones with overhead spray or stream sprinklers shall be designed to operate between 6:00 p.m. and 10:00 a.m. to reduce water loss from wind and evaporation. This would exclude drip or bubbler zones.

12. Program valves for multiple repeat cycles where necessary to reduce runoff, particularly slopes and soils with slow infiltration rates.

13. Following construction and prior to release of the secondary bond guarantee posted for the project, a Water Use Efficiency Review will be conducted by a Landscape Irrigation Auditor. The auditor shall be independent of the contractor, design firm, and owner/developer of the project. The water performance audit will verify that the irrigation system complies with the minimum standards required by Sandy City ordinance. The minimum efficiency required for the irrigation system is 60% for distribution efficiency for all fixed spray systems and 70% distribution efficiency for all rotor systems. The auditor shall furnish a certificate to the City, designer, installer and owner/developer certifying compliance with the minimum distribution requirements. Compliance with this provision is required before the City will release the bond for this project.

14. Plants which require different amounts of water shall be irrigated by separate valves. If one valve is used for a given area, only planters with similar water use shall be used in that area. Lawn areas and planters shall be irrigated by separate valves.

15. A separate backflow prevention device shall be installed for the irrigation system.

16. A rain sensing overriding device shall be utilized so that the irrigation system will automatically turn off in the event of rain.

17. The irrigation system shall be designed to prevent overspray and water run-off onto adjacent-property, non-irrigated areas, walks, roadways or structures.

18. An automatic irrigation system using pop-up sprinkler heads shall be required for all new landscapes. Low flow sprinkler heads shall be used wherever possible.

19. No irrigation of walkways or drive.

20. **Water audit is required prior to bond being released. Suggest the audit be done within 60 days of installing irrigation and landscape.**

If you have any questions with these requirement, please contact Lennie Chanthaphuang at 801-568-7293.

10-YEAR, THREE-HOUR STORM: RAINFALL INTENSITIES (INCHES PER HOUR) ADJUSTED FOR ELEVATION

ADJUST. FACTOR		0.94	0.96	0.98	1	1.03	1.06	1.09	1.12	1.15	1.18	1.2	1.19	1.17	1.16	1.14	1.13	1.11	1.1
	ELEV.	4300	4400	4500	4600	4700	4800	4900	5000	5100	5200	5300	5400	5500	5600	5700	5800	5900	6000
TIME (MIN.)	STANDARD INTENSITY	INTENSITY-INCHES PER HOUR (ADJUSTED)																	
5	3.72	3.50	3.57	3.65	3.72	3.83	3.94	4.05	4.17	4.28	4.39	4.46	4.43	4.35	4.32	4.24	4.20	4.13	4.09
15	2.28	2.14	2.19	2.23	2.28	2.35	2.42	2.49	2.55	2.62	2.69	2.74	2.71	2.67	2.64	2.60	2.58	2.53	2.51
30	1.44	1.35	1.38	1.41	1.44	1.48	1.53	1.57	1.61	1.66	1.70	1.73	1.71	1.68	1.67	1.64	1.63	1.60	1.58
45	1.15	1.08	1.10	1.13	1.15	1.18	1.22	1.25	1.29	1.32	1.36	1.38	1.37	1.35	1.33	1.31	1.30	1.28	1.27
60	0.93	0.87	0.89	0.91	0.93	0.96	0.99	1.01	1.04	1.07	1.10	1.12	1.11	1.09	1.08	1.06	1.05	1.03	1.02
90	0.69	0.65	0.66	0.68	0.69	0.71	0.73	0.75	0.77	0.79	0.81	0.83	0.82	0.81	0.80	0.79	0.78	0.77	0.76
120	0.55	0.52	0.53	0.54	0.55	0.57	0.58	0.60	0.62	0.63	0.65	0.66	0.65	0.64	0.64	0.63	0.62	0.61	0.61
180	0.40	0.38	0.38	0.39	0.40	0.41	0.42	0.44	0.45	0.46	0.47	0.48	0.48	0.47	0.46	0.46	0.45	0.44	0.44
360	0.25	0.24	0.24	0.25	0.25	0.26	0.27	0.27	0.28	0.29	0.30	0.30	0.30	0.29	0.29	0.29	0.28	0.28	0.28
720	0.15	0.14	0.14	0.15	0.15	0.15	0.16	0.16	0.17	0.17	0.18	0.18	0.18	0.18	0.17	0.17	0.17	0.17	0.17
1440	0.09	0.08	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.10	0.10	0.10	0.10	0.10

25-YEAR, 3-HOUR STORM: RAINFALL INTENSITIES (INCHES PER HOUR) ADJUSTED FOR ELEVATION

ADJUST. FACTOR		0.92	0.95	0.98	1	1.04	1.08	1.12	1.16	1.19	1.22	1.25	1.23	1.21	1.18	1.16	1.14	1.12	1.1
	ELEV.	4300	4400	4500	4600	4700	4800	4900	5000	5100	5200	5300	5400	5500	5600	5700	5800	5900	6000
TIME (MIN.)	STANDARD INTENSITY	INTENSITY-INCHES PER HOUR (ADJUSTED)																	
5	4.92	4.53	4.67	4.82	4.92	5.12	5.31	5.51	5.71	5.85	6.00	6.15	6.05	5.95	5.81	5.71	5.61	5.51	5.41
15	3.04	2.80	2.89	2.98	3.04	3.16	3.28	3.40	3.53	3.62	3.71	3.80	3.74	3.68	3.59	3.53	3.47	3.40	3.34
30	1.92	1.77	1.82	1.88	1.92	2.00	2.07	2.15	2.23	2.28	2.34	2.40	2.36	2.32	2.27	2.23	2.19	2.15	2.11
45	1.50	1.38	1.43	1.47	1.50	1.56	1.62	1.68	1.74	1.79	1.83	1.88	1.85	1.82	1.77	1.74	1.71	1.68	1.65
60	1.25	1.15	1.19	1.23	1.25	1.30	1.35	1.40	1.45	1.49	1.53	1.56	1.54	1.51	1.48	1.45	1.43	1.40	1.38
90	0.9	0.83	0.86	0.88	0.90	0.94	0.97	1.01	1.04	1.07	1.10	1.13	1.11	1.09	1.06	1.04	1.03	1.01	0.99
120	0.72	0.66	0.68	0.71	0.72	0.75	0.78	0.81	0.84	0.86	0.88	0.90	0.89	0.87	0.85	0.84	0.82	0.81	0.79
180	0.54	0.50	0.51	0.53	0.54	0.56	0.58	0.60	0.63	0.64	0.66	0.68	0.66	0.65	0.64	0.63	0.62	0.60	0.59
360	0.33	0.30	0.31	0.32	0.33	0.34	0.36	0.37	0.38	0.39	0.40	0.41	0.41	0.40	0.39	0.38	0.38	0.37	0.36
720	0.19	0.17	0.18	0.19	0.19	0.20	0.21	0.21	0.22	0.23	0.23	0.24	0.23	0.23	0.22	0.22	0.22	0.21	0.21
1440	0.12	0.11	0.11	0.12	0.12	0.12	0.13	0.13	0.14	0.14	0.15	0.15	0.15	0.15	0.14	0.14	0.14	0.13	0.13

100-YEAR, 72-HOUR STORM: RAINFALL INTENSITIES (INCHES PER HOUR) ADJUSTED FOR ELEVATION

ADJUST. FACTOR FOR TIMES: 5 - 180 MINUTES

		0.90	0.933	0.966	1	1.043	1.086	1.129	1.171	1.214	1.257	1.3	1.214	1.129	1.043	0.957	0.871	0.786	0.7
	ELEV.	4300	4400	4500	4600	4700	4800	4900	5000	5100	5200	5300	5400	5500	5600	5700	5800	5900	6000
TIME (MIN.)	STANDARD INTENSITY	INTENSITY-INCHES PER HOUR (ADJUSTED)																	
5	6.96	6.26	6.49	6.72	6.96	7.26	7.56	7.86	8.15	8.45	8.75	9.05	8.45	7.86	7.26	6.66	6.06	5.47	4.87
15	4.32	3.89	4.03	4.17	4.32	4.51	4.69	4.88	5.06	5.24	5.43	5.62	5.24	4.88	4.51	4.13	3.76	3.40	3.02
30	2.72	2.45	2.54	2.63	2.72	2.84	2.95	3.07	3.19	3.30	3.42	3.54	3.30	3.07	2.84	2.60	2.37	2.14	1.90
45	2.10	1.89	1.96	2.03	2.10	2.19	2.28	2.37	2.46	2.55	2.64	2.73	2.55	2.37	2.19	2.01	1.83	1.65	1.47
60	1.78	1.60	1.66	1.72	1.78	1.86	1.93	2.01	2.08	2.16	2.24	2.31	2.16	2.01	1.86	1.70	1.55	1.40	1.25
90	1.40	1.26	1.31	1.35	1.40	1.46	1.52	1.58	1.64	1.70	1.76	1.82	1.70	1.58	1.46	1.34	1.22	1.10	0.98
120	1.03	0.93	0.96	0.99	1.03	1.07	1.12	1.16	1.21	1.25	1.29	1.34	1.25	1.16	1.07	0.99	0.90	0.81	0.72
180	0.77	0.69	0.72	0.74	0.77	0.80	0.84	0.87	0.90	0.93	0.97	1.00	0.93	0.87	0.80	0.74	0.67	0.61	0.54
360	0.47	0.48	0.48	0.49	0.49	0.50	0.50	0.51	0.51	0.52	0.52	0.53	0.53	0.54	0.54	0.55	0.55	0.56	0.56
720	0.28	0.29	0.29	0.29	0.29	0.30	0.30	0.30	0.31	0.31	0.31	0.31	0.32	0.32	0.32	0.32	0.33	0.33	0.33
1440	0.16	0.16	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.18	0.18	0.18	0.18	0.18	0.19	0.19	0.19	0.19
2880	0.10	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.12	0.12	0.12	0.12	0.12
4320	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08

ADJUST. FACTOR FOR TIMES: 360 - 4320 MINUTES

		1.02	1.03	1.04	1.05	1.06	1.07	1.08	1.09	1.1	1.107	1.118	1.13	1.14	1.15	1.16	1.17	1.184	1.195